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MINNESOTA
CANOE AND KAYAK OWNERS:
THEIR CHARACTERISTICS AND PATTERNS OF USE

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MINNESOTA CANOE AND KAYAK OWNERS: THEIR CHARACTERISTICS AND PATTERNS OF USE

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In recent years nonmotorized boating, especially canoeing and kayaking, has increased in popularity. Great numbers of new craft are appearing on the nation's lakes, rivers, and streams. Between 1973 and 1976 records show a 68 percent increase in the number of canoes, and a remarkable 107 percent increase in the number of kayaks (U.S. Department of Transportation 1978). Presently there are an estimated 1 million canoes and 90,000 kayaks nationwide.

The rapid increase in the recreational use of canoes and kayaks is of growing concern to water resources administrators. The Forest Service has had to limit use on certain waterbodies, and institute spatial and time zoning to cope with increased use. Many of these steps seem to have worked well and have public support; others have dissatisfied users and resulted in litigation (Lime 1977). Before effective and defensible decisions can be made about recreational water resource management, administrators need basic descriptive information about canoe and kayak use (Hecock 1977). The limited information that does exist pertains only to users of specific waterbodies that have specific management problems (Anderson *et al.* 1978). Water resource administrators need State-wide or regional information on which to base decisions about canoe and kayak use.

The objectives of the study reported here were to: (1) develop a means of surveying canoe and kayak owners State- or region-wide; and obtain information on (2) the socioeconomic characteristics of canoe and kayak owners; (3) the canoeing/kayaking experience of the owner; and (4) where and how much owners and their families used their craft from April through October 1977.

STUDY PROCEDURES

Minnesota, a State with a long-standing water recreation tradition, is one of five States (Arizona, Oklahoma, Ohio, and Iowa) that presently requires the registration of paddle canoes and kayaks. Over 95,000 paddle canoes and kayaks, are registered with the Minnesota Department of Natural Resources. Approximately 28 percent (26,500) of the registered paddle canoes and kayaks are classified as commercial or belonging to nonprofit organizations such as the Boy Scouts. The remaining 68,500 craft were owned by both Minnesota residents and nonresidents.[1] For purposes of this paper, only the craft whose owners resided in Minnesota at the time of registration were included in the study population. As of January 1977, the registration files contained 65,695 such craft.

To obtain accurate information about both canoe and kayak owners the population was stratified by craft type. There were 64,118 paddle canoes and 1,577 kayaks. It was believed that a 1 percent sample of canoes and a 10 percent sample of kayaks would be sufficient to represent the population of canoe and kayak owners. To select the sample for canoes, a random number between 1 and 100 was picked and every one-hundredth name thereafter was selected as part of the sample. For kayaks a random number between 1 and 10 was selected and every tenth name was selected.

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[1]*Nonresident boat owners whose craft are not registered in their home States are required to register with the Minnesota Department of Natural Resources when their craft are used on Minnesota waters.*

To insure against double sampling a particular name and address was selected only once. To eliminate confusion for multi-craft owners individuals were instructed to answer the question for the craft whose registration number appeared on the questionnaire.

Each sampled owner's name and mailing address was printed on self-adhesive labels. These labels were transferred to envelopes for mailing the questionnaire and subsequent follow-up reminders to nonrespondents. The initial mailing to canoe owners, and two follow-ups to nonrespondents, resulted in 460 usable questionnaires out of 593 delivered for a 78 percent response. For kayak owners, the initial mailing and two follow-ups provides 98 usable questionnaires out of 144 delivered, resulting in a 68 percent response.

RESULTS AND DISCUSSION

Socioeconomic Characteristics

Canoe and kayak owners' socioeconomic characteristics and those of all Minnesotans are summarized in table 1. The Kolmogorov-Smirnov test was used to test differences (5 percent level of significance) in the distribution of the quantitative variables obtained from the study population. Caution should be used in comparing the data in table 1 with similar breakdowns published in other recreation studies. The socioeconomic data presented in the table represent the socioeconomic characteristics only of the *owners* of the craft (not necessarily the users).

Canoe and kayak owners were mainly young and middle-aged adults. On the average, kayak owners were younger (37 years) than canoe owners (39 years) and both were younger than the general population of Minnesota (table 1). Canoe and kayak owners were concentrated in the middle-age categories while the general population of Minnesota included a higher proportion of both older and younger persons.

The level of education achieved by canoe and kayak owners was greater than that achieved by the Minnesota population (table 1). Average number of years of school completed was 15.1 by kayak owners, 14.5 by canoe owners. In terms of formal education, canoe and kayak owners are similar to people who participate in backcountry recreation (Hendee *et al.* 1968, Murray 1974).

Over a third of the canoe and kayak owners had "professional" or "technical" occupations (table 1). However, a large proportion of the kayak owners (16 percent) were students, as opposed to only 2 percent of the canoe owners.

Canoe owner families had higher average annual family incomes for 1976 than did kayak owner families. Three-fourths of the nonstudent canoe owner households had incomes in excess of $15,000 compared to two-thirds of the nonstudent kayak owner families (table 1). The proportion of canoe and kayak owner families making over $15,000 annually far exceeded the proportion of families in the north-central region making a like amount. The contrast is even more dramatic when it is noted that regionally one-fifth of all families had annual incomes in excess of $25,000 while about a third of the canoe and kayak owner families had incomes exceeding $25,000 annually.

Canoe and kayak owners were primarily city residents. Approximately half of Minnesota's population is concentrated in the Minneapolis-St. Paul metropolitan area and nearly one-half (46 percent) of the canoe owners and a full two-thirds of the kayak owners lived in the Minneapolis-St. Paul metropolitan area. Approximately 15 percent of both canoe owners and kayak owners lived in rural areas. Many of the rural residents apparently did not live on working farms. This is partially shown by the low proportion of craft owners who were farmers, relative to the proportion of rural residents.

Canoeing/Kayaking Experience

Experience was measured in terms of the average age of the owners when: (1) they went on their first canoe/kayak outing; (2) the activity became an important recreational pursuit; and (3) they acquired their first craft. Membership in canoe/kayak organizations, and ownership of other watercraft were also viewed as indicators of experience.

Canoe owners, on the average, went on their first canoe outing when they were 20 and kayak owners when they were 26 (table 2). A third of the kayak owners were over 30, and a fifth of the canoe owners were over 30 when they went on their first

Table 1.—*Socioeconomic characteristics of Minnesota canoe and kayak owners' compared to Minnesota residents*

Socioeconomic characteristics	Canoe owners	Kayak owners	Minnesota population
	Percent (N=452)	Percent (N=96)	Percent (N=2.9 million)[1]
AGE			
15 to 24 years	10	21	27
25 to 34 years	28	34	19
35 to 54 years	50	44	27
55 to 64 years	9	7	12
65 or more	3	4	15
EDUCATIONAL ATTAINMENT	(N=453)	(N=96)	(N=2.2 million)[2]
Less than 9 years	2	1	19
Some high school (9 to 11 years)	4	4	11
Completed high school (12 years)	20	9	39
Some college or equivalent (13 to 15 years)	29	34	14
Completed college (16 years)	13	10	10
Post Graduate (17 years or more)	32	41	7
OCCUPATION	(N=446)	(N=94)	(N=3.1 million)[3]
Professional, technical	35	37	17
Managers, administrators	12	6	5
Clerical, sales workers	14	9	20
Crafts	14	15	13
Operatives	7	0	15
Nonfarm laborers	3	2	5
Service workers	4	3	16
Farm workers	2	2	9
Students	2	16	N/A
Others	4	6	N/A
Retired	3	3	N/A
FAMILY INCOME, 1976	(N=418)[4]	(N=75)[4]	NC Region[5]
Under $3,000	0	3	3
$3,000-$9,999	9	13	23
$10,000-$14,999	16	17	20
$15,000-$24,000	43	36	34
$25,000 and above	32	31	20

[1]Source: Minnesota State Planning Agency, Office of State Demographer. 1978. Minnesota population projections 1970-2000.

[2]Source: Minnesota State Planning Agency, Office of State Demographer. 1978. Educational Attainment in Minnesota 1977. (includes only those residents 25 years and older)

[3]Source: Minnesota Department of Economic Security, Research and Planning. 1978. Minnesota Employment Trends, 1974-1975.

[4]Student portion of the sample excluded.

[5]Source: U.S. Department of Commerce, Bureau of the Census. 1977. Statistical Abstract of the United States, 1977. Data not available for Minnesota alone. North Central Region includes Minnesota and other Upper Midwestern States.

Table 2.— *Chronological profile of Minnesota canoe and kayak owners' experience*

Experience	Canoe owners[1]	Kayak owners[2]
	years	*years*
Age when first outing occurred	20	26
Age when activity became an important recreation pursuit	27	27
Age when first craft was acquired	31	29

[1]Average age 39.
[2]Average age 37.

outing. Compared with most other outdoor recreation activities, canoeing and kayaking are activities people get acquainted with later in life. For example, Hendee *et al.* (1968) found that 70 percent of the wilderness users interviewed indicated they went on their first trip to backcountry areas before they were 15 years old. Klessig and Hale (1972) found that 90 percent of the hunters they interviewed started hunting before they were 20 years old.

Both canoe and kayak owners, on the average, were 27 when they perceived their activities as being an "important" part of their recreational pursuits. The definition of importance was self defined — respondents were asked, "what age were you when canoeing or kayaking became an important part of your recreation activity?" Interestingly, 6 percent of the canoe owners and 13 percent of the kayak owners indicated that their respective activity was not an important recreation pursuit. These owners were probably not the primary user of the craft.

Canoe owners acquired their first canoe when they were 31 and kayak owners acquired their first kayak when they were 29. The acquisition of a craft is probably related to confidence in the ability to use the craft properly, or to learn to use it properly (18 percent of the kayak owners acquired their craft an average of 3 years before the activity became important).

Both canoe and kayak owners had low membership rates in canoe/kayak "user" organizations. Only 1 percent of canoe owners in this study were members of canoe clubs; more kayak owners (14 percent) were affiliated with kayak groups. Canoe and kayak owners appear to be similar to recreationists, such as automotive campers, who generally are not affiliated with "user" organizations.

The ownership of other watercraft serves to underscore canoe and kayak owners' interest and involvement in waterbased recreation. Half of the canoe owners and two-thirds (67 percent) of the kayak owners owned other registered watercraft (table 3).

Table 3.— *Percentage of canoe and kayak owners owning other registered watercraft*

Craft	Canoe owners[1]	Kayak owners[2]
	Percent	
Kayaks	< 1	14
Canoes	12	43
Sailboats	10	16
Motorboats	22	15
Rowboats	23	17
Pontoon	2	< 1
Others	3	11

[1]N=460. (From the sample of canoe owners, 231 (50 percent) owned other craft.)
[2]N=98. (From the sample of kayak owners, 66 (67 percent) owned other craft.)

Use Characteristics

Information about use characteristics was sought for the period, April to October 31, 1977, roughly the open-water season in Minnesota. One-fourth of the kayak owners and 15 percent of the canoe owners reported their craft were not used in 1977. The socioeconomic variables — age, education, occupation, income, and place of residence — were tested with chi-square analyses to determine if they had an influence on whether or not the canoe or kayak was used in 1977, but no significant associations were found (5 percent level). The remaining findings refer only to those owners who reported their craft was used by household members in 1977.

In this study two measures of use were employed. First, total use was measured in terms of the number of times the canoe or kayak was launched in 1977. Second, the number of days, or

portion thereof, the canoe or kayak was used on each of the following: anywhere within the Boundary Waters Canoe Area (BWCA) lakes; rivers; wetlands. If the craft was used on more than one type of water body on the same day respondents were told to count one day of use for each type of water body used.

The average kayak was launched 32 times as opposed to 22 times for canoes. The highest proportion of launches for both craft types were in the 1-10 range which included 41 percent of the canoes and 30 percent of the kayaks. Nearly a fifth (17 percent) of the kayaks were launched over 60 times indicating a zealous cadre of kayakers.

The socioeconomic variables were tested independently to determine if they were related to how much the canoe or kayak was launched but no statistically significant associations were found. However, three measures of "experience" did relate to the number of times the canoe was launched. Experience was expressed in terms of the owners age: (1) when the first canoe outing occurred; (2) when canoeing became important, and (3) when the first canoe was acquired. Canoe owners who were under 30 when they experienced each of the three events reported their crafts were used significantly more than those owners who were over 30 when they experienced them. In the case of kayak owners, only the age of first outing was related to the number of times the craft was launched. Those owners who went on their first outing before they were 30 launched their kayaks significantly more than those kayak owners who were over 30 when they first went.

Most canoes and kayaks were launched during the months of June, July and August. The proportion of canoes and kayaks launched were greater during July, but fall launches were also numerous (table 4). In general, the proportion of kayak owners reporting their crafts launched during a particular month was greater than canoe owners, except during October. The canoes and kayaks that were launched during a particular month were launched an average of at least five times, except during April. During June over three-fourths of the kayaks were launched an average of 9.4 times. In July more people launched their kayaks but on fewer occasions. July was the peak month for canoe launches. October had a high average number of launches; waterfowl hunting by a minority of families probably accounted for much of this use.

Table 4.—*Percentage of canoes and kayaks launched each month and the average number of launches per month, April-October 1977*

Month	Canoes[1]		Kayaks[2]	
	Percent	Number	Percent	Number
April	15	4.3	25	4.5
May	48	5.1	66	5.5
June	75	6.2	77	9.4
July	81	6.8	89	8.5
August	70	6.4	75	8.7
September	43	5.8	49	7.0
October	23	6.5	22	7.6

[1]N=390.
[2]N=73.

Eight out of every 10 canoes and kayaks was used on lakes, the principal places of use (table 5). Those canoeists who used lakes used them for about 17 days and kayakers about 20 days. Rivers and streams were also used substantially — by more than half the canoeists and kayakers. Kayakers were more river-oriented than canoeists and those who used rivers used them substantially more than did canoeists. Wetlands — swamps, marshes, and sloughs — and the BWCA were used considerably less than rivers and lakes. Wetlands were used by 15 percent of the canoeists and kayakers; kayakers, however, used their craft on wetlands about a day more than canoeists. A fifth (22 percent) of the canoes were used in the BWCA; the area was not as attractive to kayakers — only 14 percent reported their craft were used there. Nevertheless, in terms of average number of days used in 1977, wetland and BWCA use was relatively high. When one considers the relative scarcity of these resources, the average number of days used is noteworthy. BWCA use is especially noteworthy because most Minnesota canoe and kayak households live far from the BWCA.

Most canoeists and kayakers use more than one type of water body. However, about a third of both canoe and kayak owners said their craft were used only on lakes, and about a tenth of both said rivers only. Less than 2 percent of both said their craft were used only in the BWCA or in wetlands.

Table 5.— *Percentage of canoes and kayaks used on different water bodies and average number of days used on each, April-October 1977*

Water Bodies	Canoes[1]		Kayaks[2]	
	Percent used	Average number of days used	Percent used	Average number of days used
Lakes	85	16.7	84	19.8
Rivers and streams	57	7.9	62	20.1
Wetlands (swamps, marshes, sloughs)	15	6.0	15	7.4
Boundary Waters Canoe Area	22	9.8	14	7.1

[1]N=390.
[2]N=73.

About a third of the kayak owners and a fifth of the canoe owners stated their craft were used out of Minnesota. Rivers in Wisconsin, and the lakes of nearby Quetico Provincial Park in Canada, were the most commonly used places outside of Minnesota.

IMPLICATIONS FOR MANAGEMENT

Developing Facilities for Waterbased Recreation

Management agencies could make the variety of waterbased recreation for canoeists and kayakers even greater and provide more opportunities for the high proportion of owners who reside in the Minneapolis-St. Paul Metropolitan Area. Encouraging urban waterbased recreation could alleviate pressures on more remote and sensitive waters. Close-in small urban streams, such as Minnehaha Creek in the southern suburbs and south Minneapolis, and Rice Creek in the north suburbs, provide the opportunity to experience near-natural environments despite the high population density. These and other such streams, or portions thereof, could be managed and promoted for nonmotorized recreation. Large rivers such as the Mississippi and Minnesota in the Twin Cities, and the St. Louis in the Duluth area, could be managed to accommodate more nonmotorized use, especially during periods when commercial traffic or other activities are low, such as on weekends. Lack of access for motorized craft have often limited motorized use on urban rivers. These stretches could be promoted for nonmotorized use. However, before this can happen instream pollution must be curbed.

Most owners indicated their craft were used on lakes. Lakes are also used by waterskiers, boat fishermen, and motorboats. The potential for conflict is present; as use increases so will actual conflicts. In the future it may be necessary to zone some lakes to eliminate conflicts. Water surfaces should be zoned by time, rather than by space. Time zoning would work best because the majority of canoe and kayak owners also own other watercraft. Many of these owners may live on or near lakes or may have summer homes on or near lakes. Spatial zoning would curtail or restrict the use of some craft but time zoning would allow several kinds of watercraft on the same lake, but at different times of the day.

Most canoe and kayak owners got involved in their respective boating activities before they acquired their first craft. To participate, a portion of them either borrowed or rented craft. Canoe and kayak rental agencies have an important impact on development; managers can influence and direct their impact by establishing criteria under which they must operate. For example, canoe/kayak rental should be encouraged to locate on waters especially well-suited to nonmotorized boating. Encouragement could come in the form of technical or financial assistance. For example,

managers could provide local entrepreneurs with concessionaire rights at parks or along water where use is currently light.

Water resource administrators often point out that funds are inadequate for a particular recreation facility. Canoe and kayak owners in this study were from relatively high income households. The possibility of instituting user fees for certain facilities should be explored. A recent study of Minnesota's Kettle River users revealed that canoe club members were willing to pay to use the river and for campsite construction but users who were non-club members were not (Ballman *et al.* 1978).

More innovation and coordination is needed among agencies that manage waterbased recreation. To maintain diversity, it may be necessary for agencies such as the Forest Service and the Fish and Wildlife Service, that control large expanses of land to manage that land for more dispersed or "wilderness" waterbased recreation.

The student population among the kayak owners was relatively large. The proportion of young adults in the population has leveled off and is expected to decline during the next decade. Water resource managers should be particularly cautious of projecting past participation patterns into the future, especially since students tend to be transitory and have a high propensity for being faddish. This may be exemplified in the fact that fully one-fourth of the kayak owners stated their craft were not used.

Information and Interpretive Services

Management agencies need to find innovative ways of securing input from potential users. For example, the Minnesota Department of Natural Resources tries to obtain input and assistance from the public when developing management plans for rivers considered for inclusion into the Minnesota Wild and Scenic Rivers program. Public hearings and information meetings are held in local communities near the river. These meetings are generally well attended by local people who make their feelings known. Most craft owners do not live near proposed rivers and do not belong to canoe or kayak clubs. Often their feelings concerning designation is not heard. Admittedly, canoeing and kayaking are probably not their only recreational pursuits. But to have a well-accepted and developed program input should be solicited from all potential users. Advertising and public involvement meetings held at nonconventional places and time, such as during "lunch hours" at downtown locations in the Twin Cities, or college campuses, may be a viable option.

People may go to a particular water body because it is familiar and because they know little about alternatives. A recent study evaluating the effectiveness of a brochure sent to BWCA users describing alternative routes and attractions indicated that information can be a desirable management technique to disperse use and to help recreationists find locations that match their desires (Lime and Lucas 1977). Canoe and kayak owners in the present study were highly educated and professionally oriented, and it seems likely they would be receptive to a wide range of informational materials in planning trips. Information could be presented through various media and could contain technical information, such as the "difficulty rating" for whitewater canoeing or kayaking, illustrated and explained.

On-site displays and interpretive facilities should be well designed to appeal to the user. Poorly displayed or over-simplified materials may be ignored. For example, traditional presentations of safety tips, such as cartoons and so-called "scare tactics" might not be as effective as more factual approaches. The maturity of users, in conjunction with their relatively high education, suggests the use of more sophisticated media presentations. Furthermore, on-site interpretation with users participating may be more appealing and informative. On heavily used waters, it may be advantageous to have roving "rangers" in canoes or kayaks who could give impromptu interpretation and information. This type of service should be low key and offered only when users appear interested or seek advice or assistance.

Safety Education

Canoeing and kayaking require considerable skill and knowledge of water safety. The rapid growth of these activities and the accompanying high accident rate seem to indicate the need for stronger safety education programs. (The results of U.S. Coast Guard study shows that in 1973, in

terms of amount of time engaged in boating, passengers in paddle canoes had the highest fatality rates, 1.21 deaths per million (U.S. Department of Transportation 1978).) Safety education should be an important part of water recreation management.

Management agencies and rental agencies need to work together to promote safety education because many people probably start canoeing and kayaking by renting or borrowing their craft. Training assistance and literature for distribution to users could be furnished to rental agencies. There are two advantages to this approach: (1) the user is contacted early, and (2) the message is conveyed by the private sector — which may enhance acceptability.

Management agencies could promote safety by providing incentives. For example, owners who could prove that craft users have taken a water safety course could be granted a reduction in license fee. Users could also be required to show proof of ability to float certain high risk rivers. About a fifth of the kayak owners were students. Most universities and some high schools offer courses through their physical education departments or outdoor recreation programs that teach canoeing and kayaking skills. These courses should be recognized by management agencies; agency personnel could become involved in course design and in monitoring these courses.

Although most canoeists and kayakers use lakes at present, there will be a need for transition training because river use is expected to increase. Some skills that are used for lakes are not suitable for rivers and users must be trained to make the transition from lakes to rivers a safe one.

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Provides information about Minnesota canoe and kayak owners' socioeconomic characteristics, their experience with canoeing and kayaking, and the characteristics of use. Implications for management are also presented.

OXFORD: 907.2(776). KEY WORDS: socioeconomic characteristics, experience, use, management strategies.

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Man paints houses...

only nature should paint

trees and rocks.